

CLAIM AMENDMENTS

Please amend the claims as depicted below, with additions underlined and with deletions in strikeout text or brackets. The Application is being filed with Claims 1-19, and Claim 20 is added in this amendment. Support for the amendment to Claim 4 is found at least in the specification as filed at paragraph[0008], lines 6-14. Support for the amendment to Claim 5 is found at least in the specification at paragraph [0010], lines 6-7. Support for the amendment to Claim 9 is found at least in Claim 17 as filed. Support for the amendments to Claims 11 and 18 is found at least in Claim 1 as filed, and in the specification at paragraphs [0008] and [0010] through [0012]. Claim 20 has been added. Support for new Claim 20 is found at least in the specification as filed, in paragraph [0010], lines 6-7.

1. (Currently amended) An underwater lighting unit, comprising:
an array of light emitting diodes (LEDs) mounted against ~~the back~~ a wall of a thermally conductive housing;
a collimator comprising ~~a conical or pyramidal moulding of~~ a clear transparent material in front of each LED in the array; and
a transparent screen aligned across front faces of the collimators and in contact with ~~these~~ said front faces, the transparent screen being sealingly edge-mounted in a peripheral recess around ~~the side wall or~~ walls of the housing so as to create and maintain a sealed air space between ~~the~~ an interior of the housing and ~~the conical or pyramidal walls of the collimators, the side wall or walls and optionally part of the back wall~~ at least a portion of the walls of the housing being in direct heat exchange contact with ~~the~~ water in which the lighting unit is submerged ~~in use so as to provide a proper degree of cooling for the array of LEDs.~~

2. (Currently amended) An underwater lighting unit according to claim 1, wherein ~~the~~ a back wall of the housing is ~~in use~~ in direct contact with a surface on which the lighting unit is mounted ~~, so that the said surface acts as a heat sink to~~

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~~augment the cooling provided by the contact of the side wall or walls of the housing which are in contact with the water in which the lighting unit is submerged.~~

3. (Currently amended) An underwater lighting unit according to claim 1 ~~or claim 2~~, wherein the housing is cast, formed or machined from a single piece of metal so that ~~the~~ back and side walls of the housing are contiguous and joint-free.

4. (Currently amended) An underwater lighting unit according to claim ~~[[3]]~~ 1, wherein the housing is formed from ~~stainless steel~~ a plastic material and further comprising a plate of thermally conductive metal inside the housing and in thermal contact with the housing.

5. (Currently amended) An underwater lighting unit according to claim ~~[[3]]~~ 1, wherein the ~~housing is formed from aluminium or aluminium alloy~~ collimators have transmission faces in the general shape of a hexagon.

6. (Currently amended) An underwater lighting unit according to claim 1 ~~or claim 2~~, wherein the housing is injection-moulded from a ~~highly~~ thermally conductive plastic material ~~so that the back and side walls are~~ with contiguous and joint-free back and side walls.

7. (Currently amended) An underwater lighting unit according to ~~any preceding~~ claim 1, wherein the transparent screen is a toughened glass screen.

8. (Currently amended) An underwater lighting unit according to claim ~~[[7]]~~ 1, wherein the screen is received in the peripheral recess around ~~the side wall or walls~~ at least one side wall of the housing so as to lie flush with ~~the~~ a front edge of the ~~side wall or walls~~ at least one side wall, and the screen is sealed and secured in place by a continuous bead of silicone resin placed around the recess before installation of the glass screen.

9. (Currently amended) An underwater lighting unit ~~according to any preceding claim, wherein the LEDs are mounted on one or more printed circuit boards~~ wherein the LEDs are each at least 1 watt in power.

10. (Currently amended) An underwater lighting unit according to ~~any preceding claim 1,~~ wherein the ~~or each~~ LEDs are mounted on at least one printed circuit board which is secured to ~~the~~ a back wall of the housing by encapsulating the printed circuit board or boards ~~in a thermosetting resin compound~~ with only the LEDs exposed.

11. (Currently amended) An underwater lighting unit ~~according to claim 10, wherein each collimator is a solid acrylic cone or pyramid having a recess at its apex for receiving the associated LED~~ comprising:

an array of light emitting diodes (LEDs) mounted against a wall of a thermally conductive housing;

a collimator comprising a conical or pyramidal moulding of a clear transparent material in front of each LED in the array; and

a transparent screen aligned across front faces of the collimators and in contact with said front faces, the transparent screen being sealingly edge-mounted in a peripheral recess around the side wall or walls of the housing so as to create and maintain a sealed air space between an interior of the housing and the conical or pyramidal walls of the collimators, at least a portion of walls of the housing being in direct heat exchange contact with water in which the lighting unit is submerged to provide cooling for the array of LEDs.

12. (Currently amended) An underwater lighting unit according to ~~any preceding claim 11,~~ wherein electrical leads for supplying electrical power to the LEDs pass through at least one aperture in ~~the~~ a back wall of the housing.

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13. (Currently amended) An underwater lighting unit according to claim ~~12~~ 11, wherein the ~~or each~~ at least one aperture leads to ~~the~~ an interior of a hollow tubular mounting stem extending from the back wall of the housing, the mounting stem ~~or stems~~ being externally screw-threaded for mounting the underwater lighting unit through a back wall of a cofferdam of a marine vessel or through ~~the~~ a hull of the marine vessel.

14. (Currently amended) An underwater lighting unit according to claim 13, wherein the electrical leads pass through the mounting stem ~~or stems~~ and are sealed therein by ~~having~~ thermosetting resin injected into the hollow interior of the mounting stem or stems around the electrical leads.

15. (Currently amended) An underwater lighting unit according to claim 13 ~~or claim 14~~ secured through the back wall of a cofferdam of a marine vessel or through the hull of a marine vessel, ~~with~~ further comprising a seal between the housing of the lighting unit and the back wall of the cofferdam or the hull, the seal comprising an initially flat elastomeric sealing disc ~~being~~ trapped between one or more rearwardly facing annular ribs on ~~the~~ a back wall of the housing and one or more forwardly facing annular ribs on the back wall of the cofferdam or on the hull, both ribs or sets of ribs being concentric with the mounting stem of the housing and being of increasing diameters so that the sealing disc is distorted into a corrugated shape as the housing and cofferdam or hull are drawn tightly together ~~by a nut screwed onto the mounting stem.~~

16. (Currently amended) An underwater lighting unit according to claim 15, wherein ~~the seal between the housing of the lighting unit and the back wall of the cofferdam or the hull is further enhanced by the sealing disc being received in a circular recess in the back wall of the housing~~ further comprising a circular recess and wherein, with the associated annular rib or ribs of the housing ~~extending~~ extend from the base of the circular recess.

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17. (Currently amended) An underwater lighting unit according to ~~any preceding~~ claim 11, wherein the LEDs are each at least one watt in power.

18. (Currently amended) An underwater lighting unit ~~according to any of claims 1 to 15, wherein the LEDs are each at least three watts in power , comprising~~
an array of light emitting diodes (LEDs) mounted against a wall of a thermally conductive housing;

a collimator comprising a conical or pyramidal moulding of a clear transparent material in front of each LED in the array; and

a transparent screen aligned across front faces of the collimators, the transparent screen being sealingly edge-mounted in a peripheral recess around the side wall or walls of the housing so as to create and maintain a sealed air space between an interior of the housing and the conical or pyramidal walls of the collimators, at least a portion of walls of the housing being in direct heat exchange contact with water in which the lighting unit is submerged to provide cooling for the array of LEDs.

19. (Currently amended) An underwater lighting unit according to ~~any preceding~~ claim 18, wherein there are 30 or more LEDs in the array.

20. (New) An underwater lighting unit according to claim 18, wherein the collimators have hexagonal transmission faces.